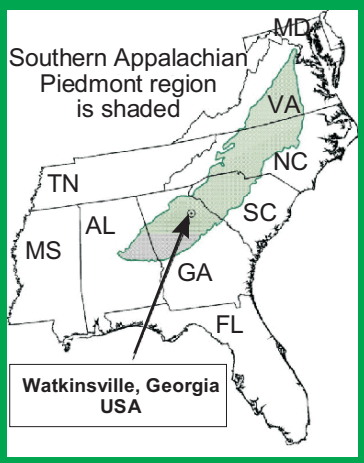
Poultry Manure Management
Soil Phosphorus Accumulation

USDA

Agricultural Research Service



J. Phil Campbell Sr. Natural Resource Conservation Center

1420 Expt. Station Rd.
Watkinsville GA 30677

Tel: 706-769-5631
Fax: 706-769-8962
www.spcru.ars.usda.gov

Research Team

Lead investigator
Alan Franzluebbers
afranz@uga.edu

Collaborators
John Stuedemann
Stan Wilkinson
Steve Knapp
Dwight Seman

Research from the Soil Resource Management National Program

JPC Research Note - 08

Why does it matter?

Poultry litter is a relatively inexpensive source of nutrients that is often applied to pastures to supply nitrogen (N), phosphorus (P), and other nutrients.

Soils in the Southern Piedmont are relatively poor in N and P.

Excessive N and P application could threaten water quality.


Application of broiler litter

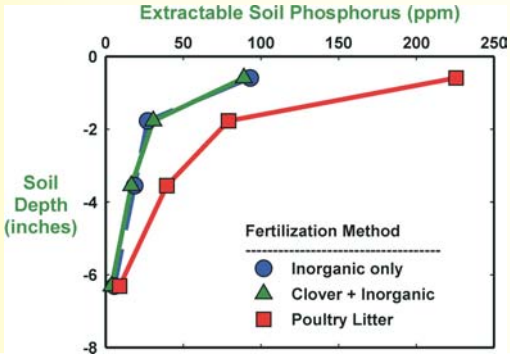
What was done?

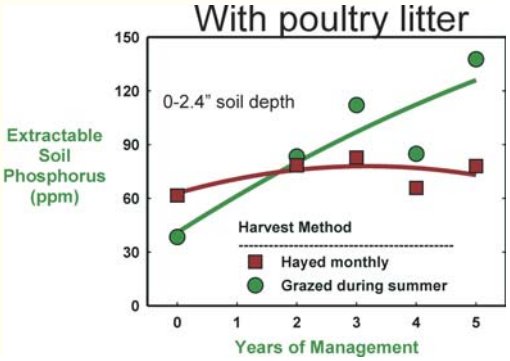
Soil was sampled yearly during 5 years of inorganic and poultry litter application to 'Coastal' bermudagrass pastures.

Extractable and total P were determined in surface soil layers under harvest regimes: (1) unharvested for conservation, (2) grazed by steers at low pressure, (3) grazed by steers at high pressure, and (4) hayed monthly.

What was found?

Fertilization based on N content resulted in greater quantity of P applied with poultry litter (254 lb P_2O_5/acre/yr) than with inorganic fertilizer (33 lb P_2O_5/acre/yr). Soil P increased more with poultry litter than with other sources. At the end of 5 years, the increase in soil P with poultry litter was greatest at the surface. Grazing returned feces and P back to land, resulting in enrichment in soil P with time.





A full description of this research can be found in the article:

Franzluebbers AJ, Stuedemann JA, Wilkinson SR. 2002. Bermudagrass management in the Southern Piedmont USA. II. Soil phoshorus. Soil Science Society of America Journal 66: 291-298.

What's the impact?

Repeated application of poultry litter based on N content led to P accumulation in grazed pastures.

Application should be managed to meet nutrient demand of forage.